$\equiv 0 \pmod{5^3}$. Hence $z \pm 7s \equiv 0 \pmod{5^2}$, so that $z=25t+7s$. Now $y=5r \pm 2z=25s \pm 7z=\pm 175t-24s$. The only solutions prime to 5 are thus

$$y=\pm 175t-24s, \quad z=25t \mp 7s.$$

Conversely, these values satisfy the given congruence.

☞Problems and solutions for this department should be sent to Dr. Wahlin, Urbana, Ill.

PROBLEMS FOR SOLUTION.

ALGEBRA.

351. Proposed by E. B. ESCOTT, University of Michigan, Ann Arbor, Mich.

Solve,
$$\begin{aligned} y^2+yz+z^2&=a^2 \ldots (1).\\ z^2+zx+x^2&=b^2 \ldots (2).\\ x^2+xy+y^2&=c^2 \ldots (3).\end{aligned}$$

352. Proposed by E. B. ESCOTT, University of Michigan, Ann Arbor, Mich.

Solve the equations,
$$\begin{aligned} x^3&=-8y+24 \ldots (1).\\ y^3&=-8x+24 \ldots (2).\end{aligned}$$

GEOMETRY.

381. Proposed by J. SCHEFFER, A. M., Hagerstown, Md.

Find the number of diagonals of a *complete* polygon of n sides.

382. Proposed by PROF. R. C. ARCHIBALD, Brown Uniuersity, Providence, R. I.

Between the side of a given rhombus and its adjacent side produced, to insert a straight line of a given length and directed to the opposite corner. "Euclidean constructions" are particularly desired.

383. Proposed by S. A. COREY, Hitsman, Iowa.

Let $ABCDE$ be a pentagon, plane, or gauche, with sides AB, BC, CD- and DE, of lengths, w, x, y, and z, respectively. Construct four other pen, tagons, $AB_1C_1D_1E_1$, $AB_{11}C_{11}D_{11}E_{11}$, $AB_{111}C_{111}D_{111}E_{111}$, and $AB_{iv}C_{iv}D_{iv}E_{iv}$, having a common vertex at A, and with four consecutive sides in each parallel to the corresponding consecutive sides, AB, BC, CD, and DE, in $ABCDE$. Further, let the lengths of the sides AB_1, B_1C_1, C_1D_1, D_1E_1, AB_{11}, $B_{11}C_{11}$, $C_{11}D_{11}$, $D_{11}E_{11}$, AB_{111}, $B_{111}C_{111}$, $C_{111}D_{111}$, $D_{111}E_{111}$, AB_{iv}, $B_{iv}C_{iv}$, $C_{iv}D_{iv}$, $D_{iy}E_{iv}$, be $-wW$, xX, yY, zZ, wX, xW, yZ, $-zY$, wY, yW, zX, $-xZ$, wZ, zW, xY, and $-yX$, respectively; the minus sign indicating the reversal of direction of the corresponding side. Prove that $(W^2+X^2+Y^2+Z^2)(w^2+x^2+y^2+z^2)=E_1A_1^2+E_{11}A_{11}^2+E_{111}^2A_{111}^2+E_{iv}A_{iv}^2$.